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Short Communication

VERHOEVEN'S GIANT RAT OF FLORES, INDONESIA (*Papagomys theodorverhoeveni* Musser, 1981; Muridae) IS A MODERN SPECIES

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Abstract

The giant rat of Flores, Papagomys armandvillei *(Jentink, 1892) lives in small remnants of relatively undisturbed forest on the island of Flores, Eastern Indonesia. It is a rare animal but in recent years specimens have been collected from Ruteng, Manggarai, (Ruteng is the capital of district Manggarai) West Flores. It appears to be most abundant (or most easily obtained) in the area around Ruteng in West Flores. Within museum collections it is represented by 13 specimens, the vast majority collected prior to 1970. From the locality records of 13 specimens the species is, or was, distributed in Potjong, Sika, Mboera, Ruteng, Manggarai, Nunang and Wewo Pongkor, Flores, Indonesia. It is also presented as subfossils of recent age from Liang Toge, a cave near Warukia, 1 km south of Lepa, in Manggarai District (ill printed as Menggarai Province), Western Flores (Musser, 1981). Also present in this deposit are the fragmentary remains of a closely related species of giant rat which has been described as* Papagomys theodorverhoeveni *by Musser (1981). This material consisted of 18 mandibular fragments with either partial or intack tooth rows (Hooijer, 1957, Musser 1981). We record here a modern specimen among other 4 specimens of* Papagomys armandvillei *collected after 1970, unfortunately represented only by skull and mandibles that was discovered in the collections of the Museum Zoologicum Bogoriense (MZB) during a check following the transfer of the mammals (and other zoological collections) from the Bogor Botanical Garden to new modern building at Cibinong, 23 km north of Bogor City.*

Keywords: Taxonomy, giant rats, status, Flores

Description

We refer readers to the detailed descriptions of both *P. theodorverhoeveni* and *P. armandvillei* given in Musser, 1981. For the most part these are not repeated here unless the modern specimen varies significantly from them or adds new data to the description.

Musser 1981 provides a diagnosis of *P. theodorverhoeveni* as follows. "A species of *Papagomys* that is distinguished from *P. armandvillei* by the following features of the lower molars: (1) the molars are smaller; (2) the laminae on each molar are thinner and spaced far from each other and nearly erect (the laminae are thick, set close together and slad forward in *P. armandvillei*; (3) the configuration of the anterolabial and anterolingual cusps at the front of each first molar is different, and an anterocentral cusp in present (absent from *P. armandvillei*); (4) large and prominent anterolabial cusps on the second and third molar, and (5) prominent labial cusplets on the first and second molar, cusplets that are erect and discrete, not pressed against the adjacent lamina, each shaped more like a large cylindrical cusp rather than a cusplet (anterorlabial and anterolingual cusps are smaller and inconspicuous relative to size of the primary cusps in *P. armandvillei,* labial cusplets are absent from nearly all specimens, minute if present).

We will now consider the lower molars of specimen of MZB 12716 in relation to each of these characters.

1) Size of lower molars. The molars of MZB 12716 are a little smaller than MZB 12717 (see Table 2).
2) Laminae of the lower molars (Figure 1) of specimen MZB 12716 are more erect than MZB 12717 (Figure 2) and in another specimen of *P. armandvillei* available to us, but this character is difficult to appreciate other than by direct comparison. We could not detect any consistent difference between the thickness of the laminae between MZB 12716 and specimens of *P. armandvillei.*
3) There is a distinct and obvious anterocentral cusp on MZB 12716 and, as a consequence, the configuration of the anterolabial cusps and anterolingual cusps differ from those of *P. armandvillei* (Figure 1)
4) The anterolabial cusps on m2 and m3 are enlarged in comparison to those of P. *armandvillei,* particularly on m2 where the anterolabial cusp is clearly the largest on the tooth (Figure 1)

5) There is a small tightly adpressed anterolabial cusplet on m1 and a small but more isolated posterolabial cusplet on ml (virtualy absent on the left mandible). There are no labial cusplets on m2 (Figure 1).

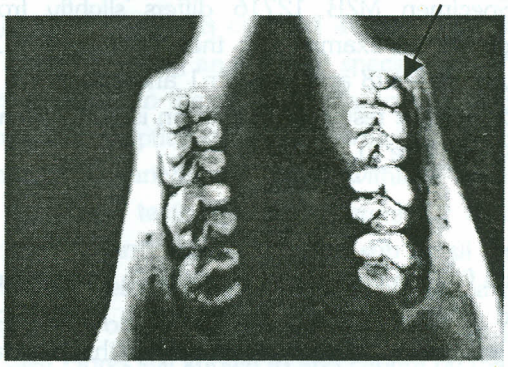

Figure 1. Lower molars of specimen MZB 12716 (*P. theodorverhoeveni*) Approximately x 4

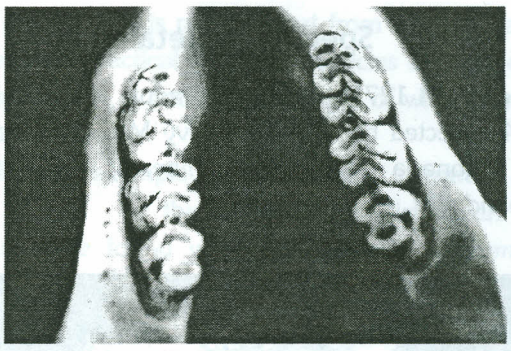

Figure 2. Lower molars of specimen MZB 12717 (*P. armandvillei*). Approximatelly x 4

On most of the above characters MZB 12716 resembles *P. theodorverhoeveni,* in particular the smaller size, enlarged labial cusps, the prominent anterior cusp on m1 and more upright laminae. It differs in the absence of labial cusplets; on m2 and the small size of those on m1 which we a feature on most specimens of *P. theodorverhoeveni.* Our specimen is from a relatively old individual judging from the tooth wear, with the molars worn to a stage where the posterior cingulums on m1 and m2 are begining to join other cusps. It is possible that they have been worn down to a stage where the cusplets are no longer separate.

Maxillary Teeth

The upper teeth of the two species are very similar in size and configuration. Specimen MZB 12716 differs slightly from all the others specimens of *Papagomys* examined in that t4 on both m1 and m2 extends more posteriorly and that t8 and t9 on m1 and less so on m2 are positioned slightly more labially. The resulting impression is that t4 is a 'squeezing' t8 and t9 out of the molar (Figure 3).

Skull

We could find no consistent difference in any skull characters between MZB 12716 and other *Papagomys* specimens in the collection. The foramen ovale are small on MZB 12716 but certainly within the range shown by *P. armandvillei*. The upper incisors are broken at their bases in the specimen (Figure 3)

Specimens details

Specimen MZB 12716 is a female, adult, found in Ruteng, Flores, on 13 March, 1974 collected by NAMRU (Navy Medical Research Unit) 2 from Ruteng, Flores, Indonesia with a field number of 4546 and misidentified as *Papagomys armandvillei*.

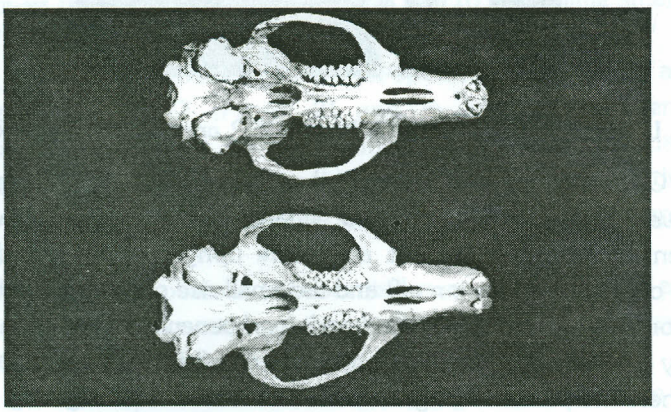

Figure 3· Skull of specimen MZB 12716 (upper) and MZB 12717 (lower). Approximatelly x 1.25.

Discussion

We consider that specimen MZB 12716 is a modern specimen of *P. theodorverhoeveni* on the grounds outlined above. We have considered the possibility of the specimen being an aberrant specimen of *P. armandvillei* but consider this is unlikely due to the range of characters concerned and the fact that it differs from the description of *P. theodorverhoeveni* only in the lack of cusplets, which are often variably impressed within a species. The size and configuration of the molar teeth are too different for it to be *Spelaeomys florensis* Hooijer, 1951, and relatively large sub fossil murid from Flores (Musser, 1981). This implies that within the modern fauna of Flores there are two species of giant rat one *P. armandvillei* is rare but, particularly in the Ruteng region of west Flores still known to and caught by the local people, and another, *P. theodorverhoeveni,* known only from one modern specimen and, based on the number of known skulls, must be considered very rare and highly endangered. Unfortunately this paper, apart from alerting people to its recent presence provides little practical help since species can still only be identified from the mandibular teeth, a detailed inspection of which on the living animal we would not recommend.

This is not the first example of a rodent first described as a fossil being found alive on Flores. In the same deposit in which the subfossil *P. theodorverhoeveni* were found were specimens of *Paulamys naso* Musser, 1981 about the size of a large house rat *(Rattus tanezumi)* a living specimen of which was found in 1989 at Gunung (Mountain) Kelimutu, Central South Flores by. Dr. D.J. Kitchener, Dr. R.A. How and Ir. Maharadatunkamsi (Kitchener *et al.*, 1991). It would appear that in Flores some species which were part of its unique fauna and were thought to be long extinct have survived, albeit in seemingly very low densities, to (or almost to) the present day. Hopefully our slowly increasing knowledge of and concern for the smaller mammals of Indonesia will lead to further discoveries of both these animals in Flores which will in turn lead to, conservation work aimed at securing the future of these unique animals.

Acknowledgements

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Table1. Cranial measurements (in millimeters) of MZB. 12716 and specimens of *P. armandvillei* (detail measurements see Musser, 1981)

Characters	*P. armandvillei* (Musser, 1991)	MZB.12716	MZB.1279	MZB.12717
Greatest length of skull	76.9 - 81.5	80.9	75.8	83.0
Zygomatic breadth	31.1 - 41.5	40.5	42.1	43.8
Interobital breadth	7.7 - 9.8	10.1	9.2	9.7
Length of nasals	24.5 - 32.0	29.7	29.1	32.4
Length of rostrum	21.9 - 26.4	27.5	25.5	27.3
Breadth of rostrum	11.7 - 15.0	14.5	15.3	15.5
Breadth of zigomatic plate	6.9 - 11.1	8.9	8.6	8.7
Depth of zigomatic notch	2.8 - 4.8	4.3	3.4	3.9
Length of diastema	17.4 - 24.3	24.7	21.8	24.9
Length of palatal bridge	17.7 - 20.1	19.8	20.2	22.5
Length of incisive foramina	9.8 - 14.4	13.0	14.5	13.2
Breadth of incisive foramina	3.8 - 4.5	4.4	4.9	4.6
Breadth of mesopterygoid fossa	3.5 - 5.6	5.2	6.0	5.4
Length of tympanic bulla	10.2 - 11.4	10.7	11.9	11.2
Height of tympanic bulla	8.4 - 10.2	11.0	11.9	11.2

- We examined other 2 specimens of *P. armandvillei* from Manggarai (MZB. 2718 and 15928) but we did not measured them because both of them have broken skulls.

Table 2. Lengths and breadths (in millimiters) of upper and lower molars of MZB. 12716, specimens of *P. theodorverhoeveni* * (lower only)

Teeth		MZB.12716	*P. theodorverhoeveni* Taken from Musser, 1981	MZB.12719	MZB.12717
Length	M^{1-3}	15.1		14.7	15.1
	M^1	4.9		4.8	5.1
Breadth	M^2	4.7		4.7	4.7
	M^3	4.1		3.9	3.6
Length	M_{1-3}	14.9	12.0 - 14.0	14.5	15.1
Breadth	M_1	4.2	3.5 - 4.2	3.8	4.5
	M_2	4.5	3.6 - 4.2	4.7	4.7
	M_3	4.2	3.3 - 4.0	4.3	4.3

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